

DFC OPEN STANDARD MARKET VALIDATION REPORT



**OPEN FOOD
NETWORK**



**DATA FOOD
CONSORTIUM**



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Ministry of
Agriculture, Food &
Rural Affairs



EXECUTIVE SUMMARY

This report details the results of a market validation research project that Open Food Network (OFN) Canada conducted in Ontario from May 2022 to January of 2023, in partnership with researchers from the University of Guelph.

This field research is designed to gauge provincial interest in the adoption of the [Data Food Consortium](#) (DFC) open standard, an interoperability solution that facilitates the cross-platform sale of local food and farming products, and the coordination of optimised logistics solutions.

In addition to assessing stakeholder demand for the digital services that the DFC open standard offers, this market validation research also initiated relationship-building with potential industry partners, with a view to future implementation in Ontario. Over the course of eight months, we engaged 28 local food system stakeholders as well as 13 ecommerce, AgTech, farm management, and social impact organisations. In addition to one-to-one calls and email engagement, we ran three focus groups with farmers and market managers, as well as a Discovery Roundtable with technology providers and local food system industry experts.

We found that end-users want a more modular and interoperable AgTech ecosystem. The interoperability requirements of end-users are driven by their need to effectively scale and optimise agrifood short supply chains and local food marketplaces. A majority of end-users reported that lack of interoperability between ecommerce platforms makes data management time-consuming and challenging. Lack of interoperability frequently resulting in lost sales for farms and the failure of online markets. The most urgent interoperability need of local food systems stakeholders at this time is the ability to conduct secure cross-platform sales and transactions. Focus group participants overwhelmingly preferred the DFC open standard when presented with other interoperability solutions and projects.

Industry players recognise that the adoption of a common standard would address these key issues, while providing their users with further benefits and enhanced digital services. In addition to supporting the cross-platform sales functionality that end-users want, industry players report that the adoption of a common standard could also unlock innovation in a host of other areas. There is substantial alignment between end-user needs and industry objectives, and significant early-stage interest in the DFC open standard itself as a solution of interest among both stakeholder groups.

However, industry players also highlighted that the adoption, implementation, maintenance, and ongoing co-development of a standard is a challenging task, requiring robust data stewardship and standard development governance process and protocols.



A related challenge is that to function as it is designed to, a common standard must secure widespread buy-in and adoption from a substantial cohort of industry players, without which the benefits of a standard cannot be realised. Establishing a new standard in a region is a ‘heavy lift,’ requiring the development of trust and cooperation between tech providers that may have good reason to view each other as direct competitors. Nonetheless, the success of global health data projects such as [CDISC](#) demonstrates that complex cross-sectoral interoperability and data stewardship initiatives can succeed at scale. To replicate these successes in the context of this region’s agrifood short supply chains and local food systems it will be necessary to implement a new phase of networking and stakeholder engagement, to support ongoing discussion, trust building, and collaboration between industry players.

By continuing to support scoping and discovery sessions around the DFC open standard and sector-wide interoperability strategies in general, the province of Ontario can help to ensure that its local food short supply chain stakeholders gain access to essential technology services that can do much to enhance the efficiency, performance, and profitability of agrifood short supply chains. Whether or not the DFC open standard is ultimately selected by players in this region as their standard of choice, supporting this cohort’s ongoing discovery and scoping of the DFC open standard would do much to help the sector define its overarching interoperability strategy going forward.



INTRODUCTION

This report details the results of a market validation research project that Open Food Network Canada conducted in Ontario from May 2022 to January of 2023, in partnership with researchers from the University of Guelph. This field research is designed to gauge provincial interest in the adoption of the Data Food Consortium (DFC) open standard, an interoperability solution that facilitates the cross-platform sale of local food and farming products, and the coordination of optimised logistics solutions. In addition to assessing stakeholder demand for the digital services that the DFC opens standard offers, this market validation research also initiated relationship-building with potential industry partners, with a view to future implementation in Ontario.

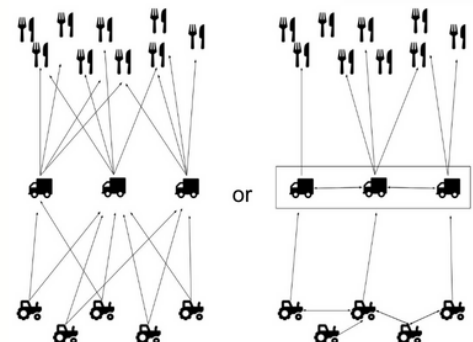
THE PROBLEM

In Ontario's short supply chain ecosystem, local food producers and distributors are currently unable to conduct 'cross platform' sales, due to a lack of common data standards across ecommerce providers.

For stakeholders, this lack of interoperability results in a scenario that is much like having a cellphone that can only make and receive calls between users of the same network. In cases where a farm wants to distribute its products via a local online retailer but the two parties do not share a common ecommerce provider, farms are forced to choose between managing inventory manually across multiple platforms or missing out on new sales opportunities.

Online aggregators, markets, and food hubs face symmetrical issues, with markets losing out on the acquisition of new suppliers due to vendor reluctance to adopt the use of yet another platform. Lack of ecommerce platform interoperability also has implications for local delivery and logistics agents who are unable to easily access a comprehensive real-time account of local food distribution and logistics needs within their service area. This leads to delivery route inefficiencies that result in higher costs for direct-to-consumer farms and local food aggregators.

Many business are running distribution routes that cover the same area





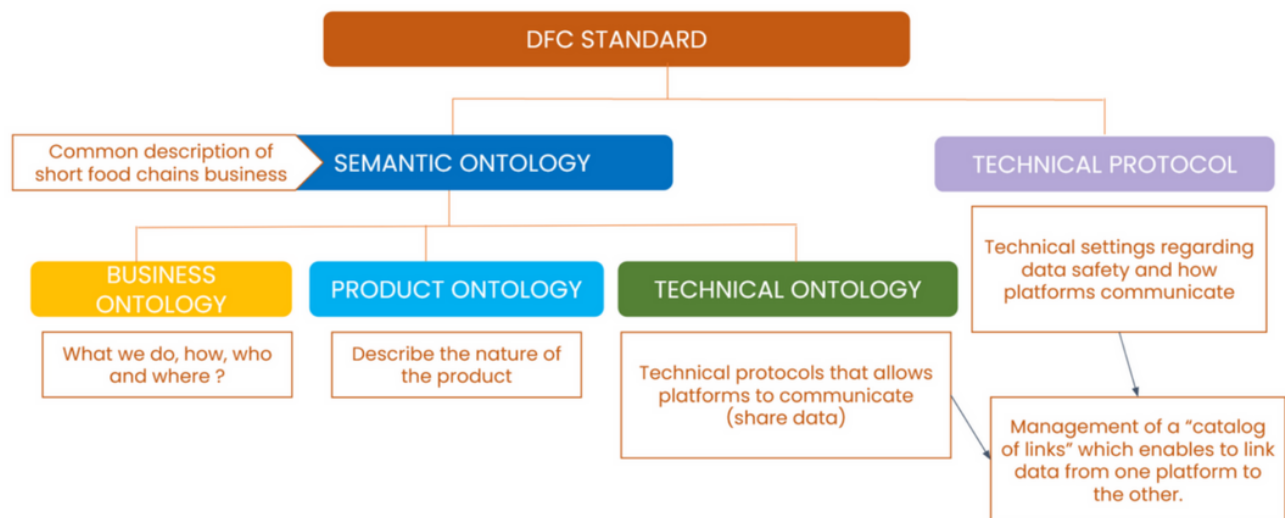
THE SOLUTION

These interoperability challenges are not unique to local food system stakeholders in Ontario. Indeed, tech providers in other jurisdictions have already begun developing solutions to the interoperability challenges that are faced by stakeholders in this province.

The Data Food Consortium – a consortium of French ecommerce providers and short supply chain players – was formed in 2017 to spearhead the development of a new data standard for agrifood short supply chains. This standard is designed to enable the growth of a more modular and interoperable ecommerce and logistics ecosystem for short supply chain players. Developed in consultation with ontologist Bernard Chabot, the DFC open standard is now being field-tested in France and the UK, where it is being deployed to enable the following key technology services:

1. Allows producers to access a universal catalogue of their products across multiple ecommerce platforms and points of sale, and control what they are making available to each of their distribution channels, from a single dashboard
2. Allows producers to see a full range of logistic flows for each of their distribution channels, from a single dashboard
3. Allows producers to access a real-time display of compatible delivery routes from other nearby producers, allowing for the development of regionalized distribution and logistics systems for local food and farming products.

Data Food Consortium standard





OUR RESEARCH

The goal of our market validation research was to assess provincial interest in the adoption of the DFC open standard in Ontario. Our research moved through two phases: 1) We began with end user engagement via a series of online focus groups; 2) We then conducted industry outreach by hosting information sessions, product demonstrations and 'walkthroughs' of the DFC open standard ontology with potential industry partners.

END-USER ENGAGEMENT

Between May 17th and June 29 of 2022, we conducted three focus groups with 28 local food systems stakeholders. In all cases, we selected focus group participants because they were active stakeholders in local food systems (i.e. farmers, aggregators, and supply chain coordinators), who used digital tools to manage at least some aspect of their business. The vast majority of participants were Ontario residents (82%) .

Our focus groups were designed to review general technology use cases, identify common pain points, assess interoperability needs and challenges, and gauge participant interest in the DFC open standard. A total of 28 participants provided the following key insights:

- Participants had an overwhelmingly favourable view of digital platforms in general, with the majority (>70%) reporting that digital tools increase their sales and make farm and market management easier.
- A majority of stakeholders (>60%) reported that lack of interoperability between ecommerce platforms made data management time consuming and challenging
- Lack of interoperability frequently resulted in lost sales for farms and the failure of online markets.
- The vast majority of stakeholders (>80%) reported that the ability to conduct 'cross-platform' sales and transactions would help local food businesses scale and succeed.

To set the DFC open standard in context, focus group participants were introduced to a variety of interoperability projects and approaches. They were asked to identify the projects they preferred before explaining their preferences. Key findings were as follows:

- Stakeholders prioritised ecommerce platform interoperability before other interoperability solutions (i.e., their most immediate needs are for ecommerce tools that 'work together').
- The most urgent interoperability need of local food systems stakeholders at this time is the ability to conduct secure cross-platform sales and transactions.
- The vast majority of stakeholders (>80%) want more interoperable and modular ecommerce systems.
- Participants overwhelmingly preferred the DFC open standard when presented with alternate interoperability solutions and projects.



INDUSTRY ENGAGEMENT

Having established that there was strong stakeholder demand for interoperability solutions that are offered by the DFC open standard, we approached other ecommerce, farm management, and AgTech platforms to explore their interest in the DFC open standard. Our outreach materials highlighted the following advantages of the DFC open standard interoperability solution:

- The DFC open standard was developed specifically to meet the unique needs of local food systems and short supply chains.
- Local food system stakeholders demonstrate strong support and value alignment with the Data Food Consortiums field-tested open standard.
- Existing data standards are not suitable for use in the context of local food systems due to the latter's decentralised, multi stakeholder complexity. In local food systems, retailers typically source and aggregate stock from across multiple small direct-to-consumer farms, making widespread coordination challenging.
- Because the DFC open standard is developed as an open source project, it can be quickly leveraged and easily modified to suit the needs of Ontario stakeholders.
- In adopting the Data Food Consortium open standard, the region's ecommerce providers and grassroots stakeholders would leverage the five years of R&D, and over €1,000,000 in ongoing active funding the standard has received.

From June 2022 - January 2023, we engaged a total of 13 ecommerce, farm management, AgTech, and social impact organisations, via outreach mechanisms such as one-to-one discovery calls, fact finding roundtables, product demos, and 'deep dives' on the DFC open standard schema and ontology. This group of 13 organisations included 3 food and farming ecommerce platforms (Local Food Marketplace, Local Line, OFN Canada); 1 local food aggregation platform (Permanent); 2 farm management platforms (LiteFarm, FarmOS); 1 impact fund (Collega); 1 logistics and food hub software platform (Farm Fare), 1 open source AgTech consortium (OpenTEAM), 1 'community research' tech provider (OurSci); 1 web3 technology provider (Startin' Blox), 2 food data interoperability consortia (Food Data Collaboration, Data Food Consortium). Over 90% of these industry players and tech providers acknowledged the need for common standards, with a majority expressing interest in participating in ongoing discussion concerning the use of the DFC open standard itself.

Other key findings were as follows:

- Technology providers see lack of common standards as a major issue facing the local food and farming sector as a whole
- Major pain points created by lack of a common standard include: Wasted developer time; data siloing; replication of work (i.e. 'reinventing the wheel')



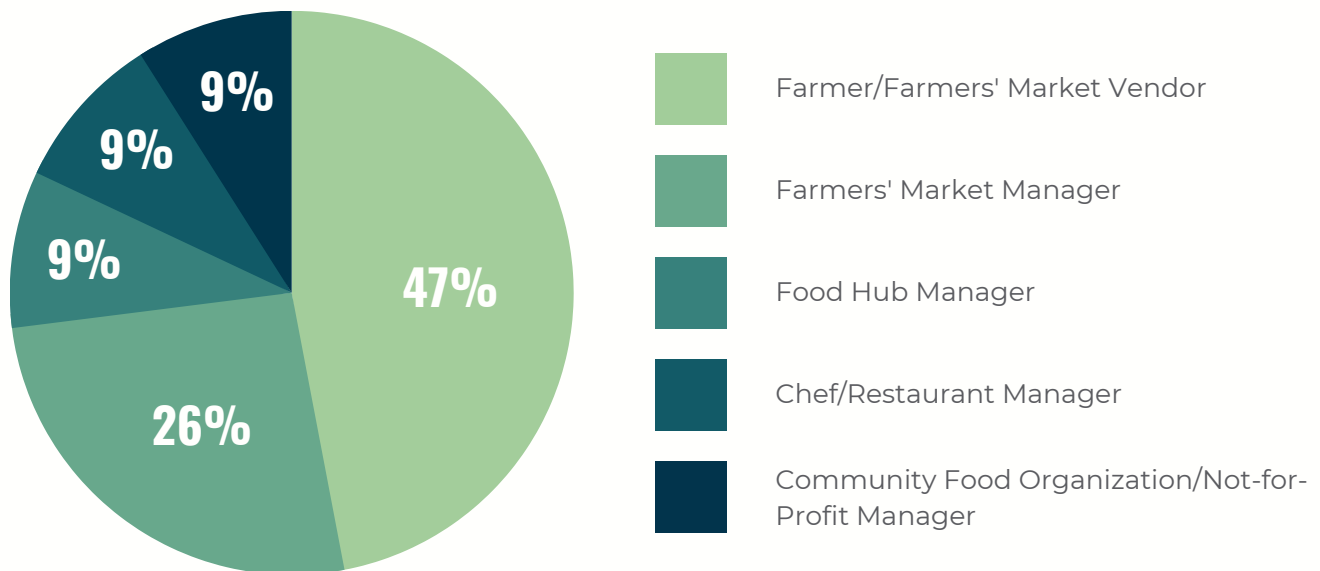
- Potential use cases for a common standard include: Enhanced inventory management and cross platform sales functionality; advanced predictive analytics; enhanced supply chain transparency and logistics management solutions; more accurate impact reporting; generation of new revenue streams for farms and hubs via the formation of agrifood data co-ops
- Industry players identified the following issues as key barriers to adoption: The need to define mutually-acceptable data stewardship protocols, processes, and fiduciary responsibilities; the need to determine governance processes for managing the ongoing development and maintenance of the standard across multiple parties; the need to establish substantial cross-sectoral “buy-in”
- The vast majority of the platforms that we contacted were interested in enhancing interoperability between ecommerce, farm management, and soil science apps – for the purpose of improving predictive analytics and supply chain transparency and traceability



END-USER FOCUS GROUPS RESEARCH PROCESS AND METHODOLOGY

FOCUS GROUPS

All three focus groups were hosted via the Zoom video communications platform. We recorded video and transcribed audio, with each session lasting approximately 90 minutes. Participants received a \$50 gift card as compensation for their time. The majority of participants (23 of 28) also completed a follow-up survey. In their survey responses, participants detailed key technology use cases and pain points, and offered feedback on the different interoperability products that were profiled and discussed during their focus group. The majority of stakeholders who took part in our focus groups were farmers and market vendors, followed by farmers' market managers. Of the 28 stakeholders who took part in our focus groups, we received 23 unique survey responses.





The markets and hubs who took part in this research were of varying size, from small to medium-scale, representing rural areas, small towns, and cities across Ontario. The largest market/hub that took part in this research aggregates products from nearly 100 farmers and vendors across Southern Ontario. We did not ask how large the farms were who took part in this study, but focus group discussion indicated that most were small-to medium-scale, selling direct-to-consumer or via local aggregators. The majority of stakeholders (69%) who took part in this research were between the ages of 26 and 50.

We began each focus group with a series of context-setting presentations that provided background on emerging trends, explained key interoperability terms and concepts, and profiled a number of different interoperability solutions. We asked questions to participants along the following themes:

- Successes with digital tools
- Common pain points and current technology needs

We also wanted to know what types of ecommerce tools participants use, distinguishing between generic ecommerce platforms (platforms designed for all forms of ecommerce) and 'tailored' farmgate platforms (platforms designed for local food systems use, specifically).

In addition to gathering data on stakeholders' perceptions of digital tools and identifying common use cases, we wanted to assess their interoperability needs and their interest in the DFC open standard as a potential solution.

Following focus group audio transcription, we undertook a thematic content analysis of the transcript data. In doing so, we identified and grouped quotes from participants that were conceptually similar and repeated by multiple individuals. We focused on identifying themes regarding successes with digital tools, common pain points, and interest in the DFC open standard as compared to other interoperability solutions.

This report reviews researchers' findings based upon: (1) notes made during the focus group meetings, (2) a review of the audio and video recordings, and (3) a thematic content analysis of the typed transcripts from the three meetings.

In providing a digest of participant feedback during the focus groups and follow-up survey, we present our findings thematically. Subsections include representative quotes from focus group transcripts as well as graphs, charts, and descriptive percentages drawn from follow-up survey data.



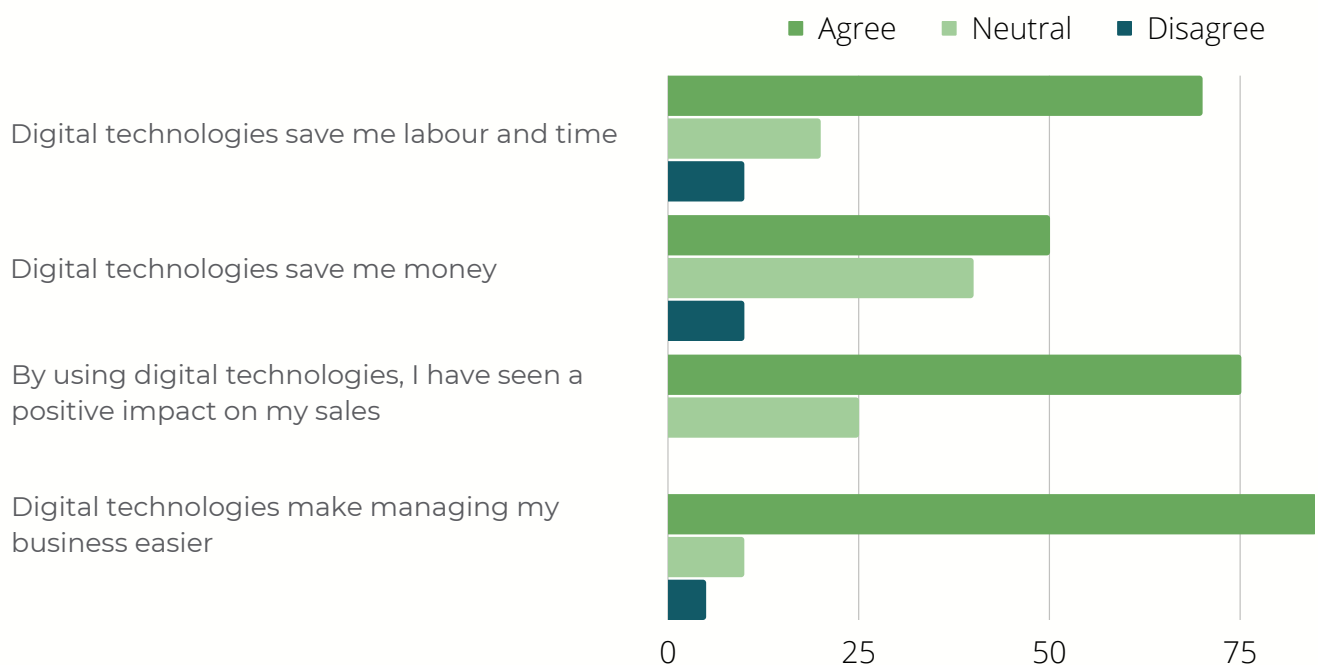
END-USER FOCUS GROUPS RESULTS

SUCCESSSES: THE BENEFITS PARTICIPANTS HAVE OBSERVED SINCE USING DIGITAL TOOLS

The majority of focus group participants (>75%) indicated that they have observed numerous business-related benefits due to digital tools, and believe these technologies will bring opportunities to the local food sector as a whole. Many used an ecommerce platform for the first time during COVID-19 lockdowns, and most have continued using a platform following the lifting of lockdown restrictions. Most survey respondents (>90%) agreed that digital tools increased their sales and made overall farm management easier. They also agreed that digital tools save them time and money. Further, most survey respondents (>75%) agreed or strongly agreed that digital tools could result in sector-wide benefits, such as increasing the number of people who buy local and helping smaller-scale farmers compete with larger businesses.

We asked participants to indicate their level of agreement with a set of statements regarding successes they've experienced since using digital tools.

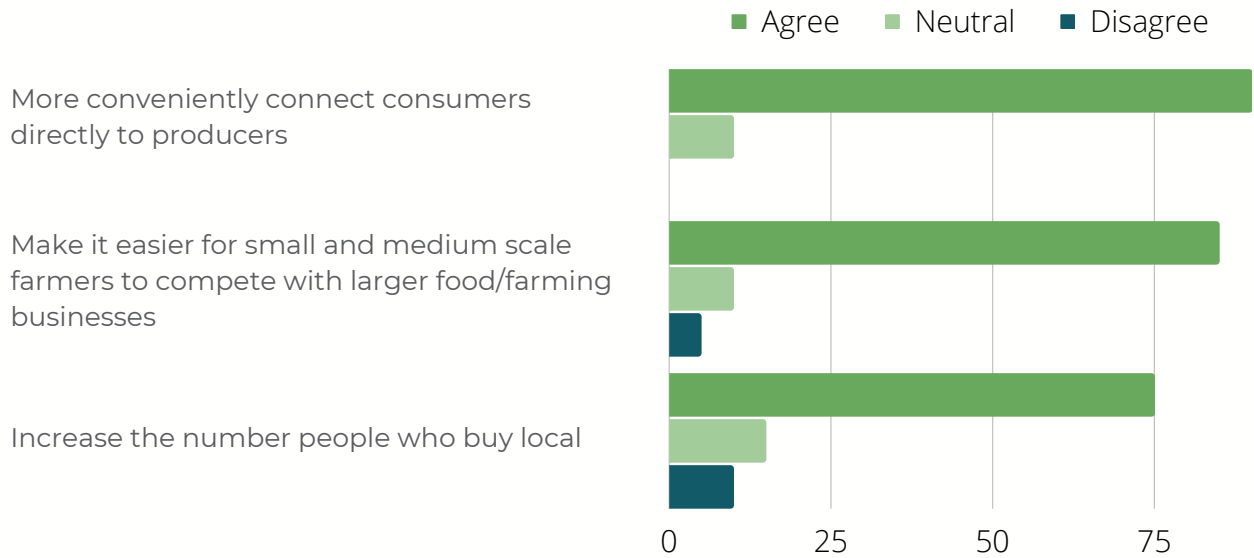
Digital technologies increase sales and make business management easier.





We asked participants to indicate their level of agreement with a set of statements regarding the potential sectoral impacts of digital technologies.

The majority of stakeholders agreed that digital technologies have positive impacts on local food systems.



During COVID-19, we participated in a digital platform for our local farmers' market, where we've been farmer vendors for over 12 years. My husband was resistant to doing this, we had already established a 'call us with an order \$20 and over and we'll deliver,' to our local customers. We were astounded to find that our farmers' market orders INCREASED our expected sales.

-Farmer



I couldn't imagine us doing the business without these tools...in terms of efficiency and effectiveness, I think I couldn't imagine us being able to replace them at this point.

-Food Hub Manager



The benefits since we started using a [digital farmgate] platform? I've probably added about 60 new vendors and I'm able to manage them in real time...there's a lot of stuff you can do once you have the time to figure it out.

-Food Hub Manager

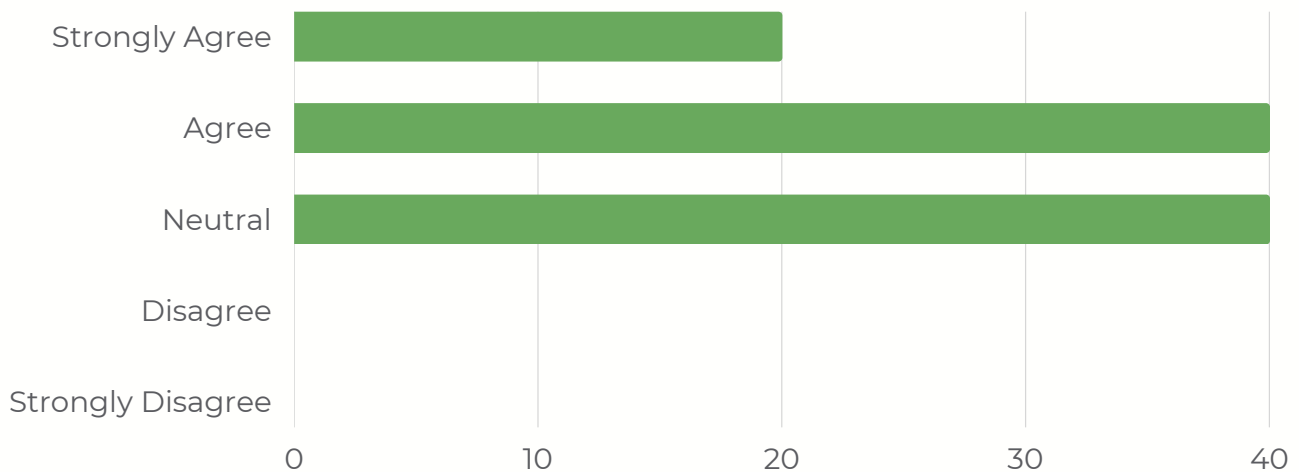


PAIN POINTS: FARMERS AND MARKET VENDORS

For farmers and market vendors, the current lack of ability to conduct cross-platform sales between ecommerce platforms is a major challenge. The majority of farmers and market vendors (60%) agreed that it is challenging (and expensive) to navigate all the different platforms used across the local food system. This has resulted in situations where farmers and vendors have opted out of using multiple online platforms because of the increased data management workloads and subscription costs.

We asked participants if they agreed that everyone uses a different tool (e.g. ecommerce platform), making it hard to transfer data between platforms.

A majority of Farmers and Market Vendors who answered this question (60%) indicated that it is challenging to reconcile data across the diverse platforms in use across local food systems. No respondents disagreed with this statement.



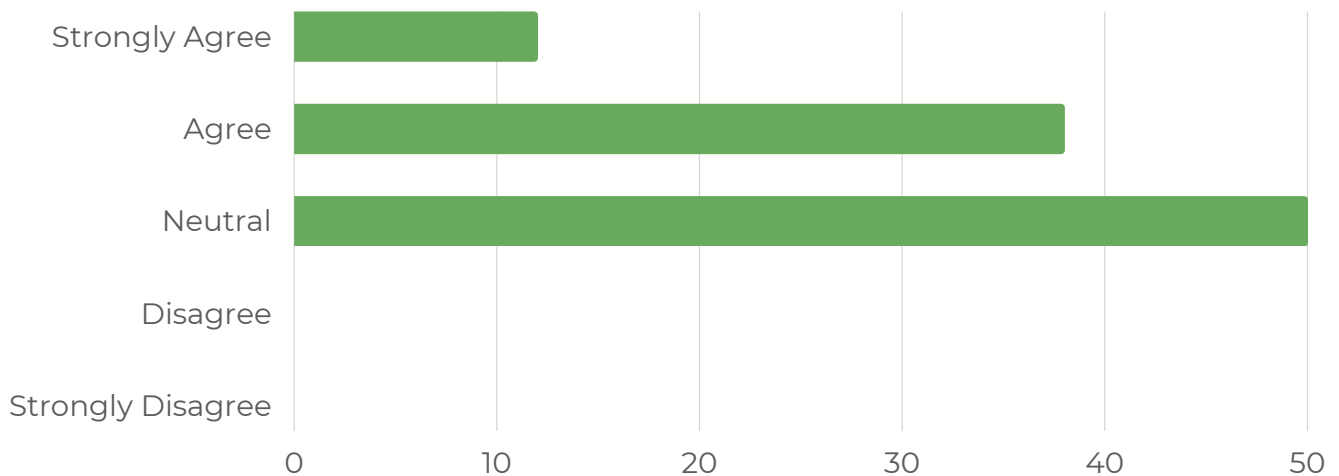
We are receiving more invitations to participate in digital food hubs but we cannot assume the extra time required to maintain inventory across different platforms let alone the subscription costs that come with it.

-Farmer



We asked participants if they agreed that lack of ecommerce platform interoperability has had a negative impact on their business.

Half of the farmers and market vendors who answered this question indicated that lack of interoperability between ecommerce platforms has had a negative impact on their business. No respondents disagreed with this statement.



Trying to divide your inventory between multiple platforms, it really makes it challenging. I think it adds another layer to what farmers are having to do, in terms of what they harvest and bring to markets...to manage all of those separate inventories on top of the work that they're already doing out in the field for like, long hours in a day, depending on the scale and size of their team — to then have to manage all these different platforms, it just adds another layer.

-Farmers' Market Manager

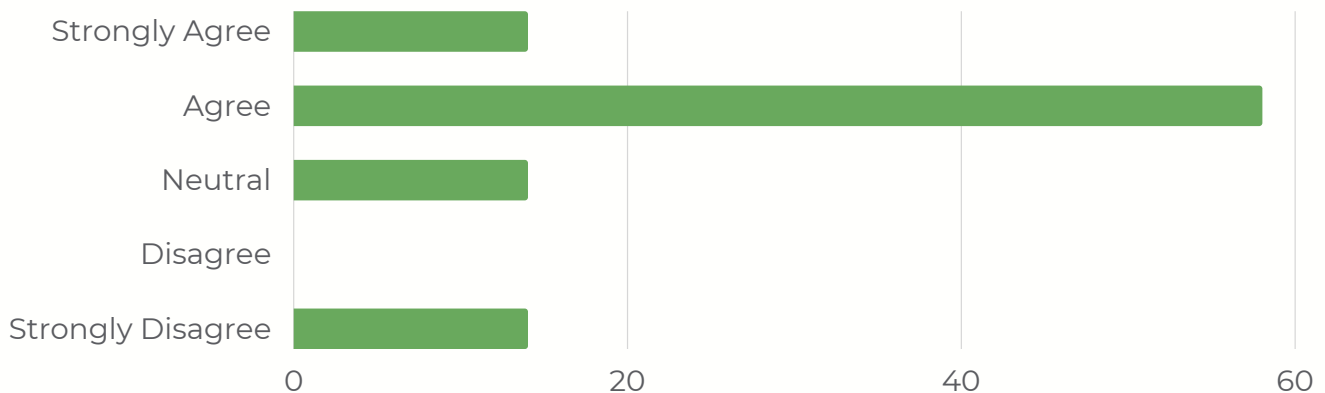


PAIN POINTS: FARMERS' MARKETS AND FOOD HUBS

For farmers' markets and food hubs, interoperability-related challenges were even more acute. The vast majority (>75%) of survey respondents indicated that they experienced increased data management workloads due to lack of platform interoperability. Further, many farmers' market and food hub managers reported that their online markets lost potential suppliers due to lack of cross-platform sales functionality. This led a significant number of the hubs and markets that we surveyed (>70%) to consider halting their use of ecommerce platforms altogether due to vendor recruitment issues. A number of the market and hub managers (who are sometimes working in a volunteer capacity) reported that the added demands on their time and resources are not sustainable—despite the fact that most agree that ecommerce adoption has generated positive business impacts.

We asked participants if lack of platform interoperability has made them consider stopping and/or has made them stop using online platforms.

Over 70% of farmers' market or food hub managers agreed or strongly agreed that lack of platform interoperability had caused them to consider stopping using an ecommerce platform.





The [lack of] interoperability between the technology platforms has been a challenge for many farmers' market vendors. Many of them have different platforms for online shops. Managing additional platforms means they are required to manage multiple inventories and products when many vendors are already stretched for time and resources, often farming more than full-time or running small entrepreneurial businesses that require them to wear many hats. I found vendors opted out of using specific online platforms (and in some cases all online platforms) due to requiring additional resources and people power to manage them.

-Farmers' Market Manager



The challenge I found, as a market manager, is that there are so many different platforms that people use. So the integration was challenging and just to get the capacity for vendors to manage different inventories across different platforms. That was really a barrier for them because they are dealing with inventories split between different markets.

-Farmers' Market Manager



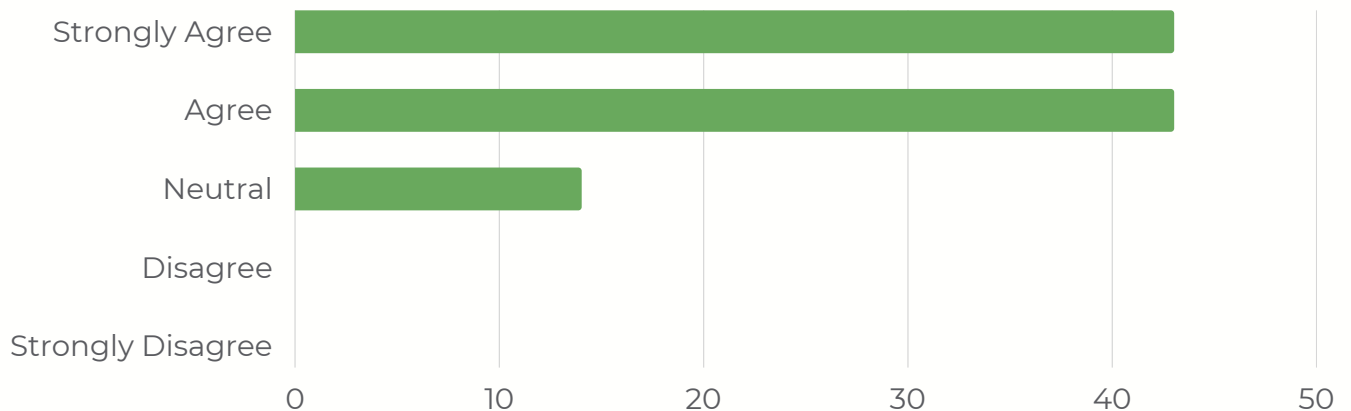
The problem we ran into is some [vendors] were already on other platforms. So, if I had say ten farmers, five of them might have been on our platform, and then...there'd be like two or three of them for whom the platform was incompatible. There wasn't a way within our software to have a complete list of all our vendors. It was quite frustrating. We literally just wanted people to connect with local food.

-Farmers' Market Manager



We asked participants if a lack of platform interoperability had increased their data management workloads.

Over 85% of farmers' market or food hub managers agreed or strongly agreed that lack of platform interoperability increases their data management workloads. No respondents in this stakeholder group disagreed with this statement.



We have about, I don't know 60 different farmer and artisan members. And the thing that we've come across is they all use different platforms. So when we actually tried to coordinate them all into one, it was impossible. So that's why we just stopped paying for an online platform that wasn't working for us, because half the people could join and half the people couldn't. So we're in limbo right now.

-Farmers' Market Manager



I just wanted to say that what you just presented is really what our market experienced. We created an online store and some farmers didn't want to join, because it was too complicated. They already had their own existing store. We tried to promote all of these platforms separately, but customers didn't want to go to a bunch of different places.

-Farmers' Market Manager



The other thing we found is, that for farmers that were on multiple different platforms, they had to estimate the amount of stock each week across the different platforms. And because they were doing this across platforms that weren't integrated they had to put a set amount of inventory on each site. So they would lose sales, definitely. Because if they ran out at one place that stock didn't automatically get to the next place. It was always a guessing game. So having it all come from one source would definitely help—you wouldn't lose sales that way.

-Farmers' Market Manager

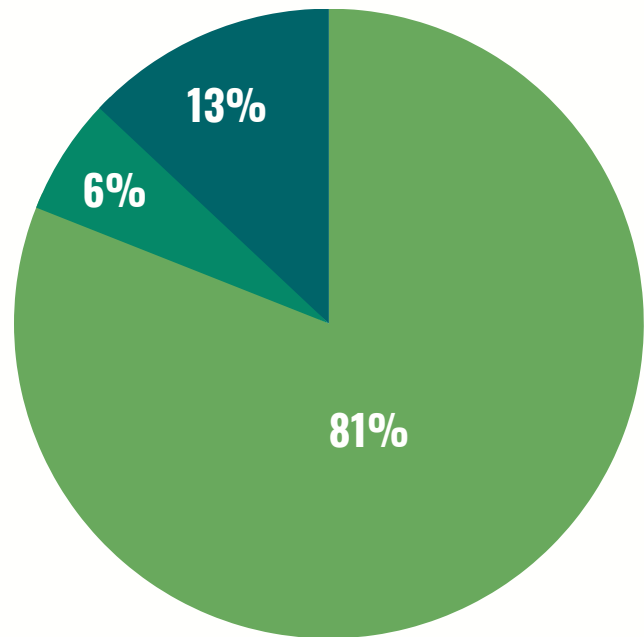
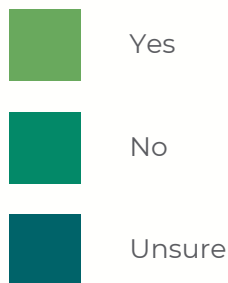


INCREASING CROSS-PLATFORM SALES: A PRIORITY FOR LOCAL FOOD SYSTEM STAKEHOLDERS

Overwhelmingly, focus group participants support the development of more interoperable digital platforms in the local food sector. The majority of participants who answered our survey (81%) indicated that ecommerce providers should prioritise developing interoperability solutions that support cross-platform sales. Most of those participants prioritised the integration of digital farmgate platforms—those platforms dedicated specifically to local food system ecommerce models—with generic ecommerce solutions designed for general ecommerce functionality. Further, we found that markets tend to skew toward using dedicated digital farmgate platforms while farmers instead use a combination of generic and farmgate tools.

We asked participants: Is increasing cross-platform interoperability something we, at Open Food Network, should prioritize to meet their business needs?

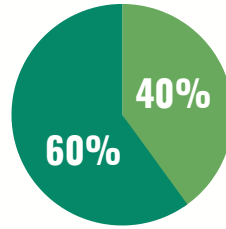
Participants want more interoperable digital platforms.



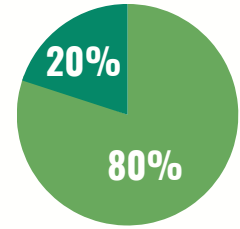


In our focus group intake forms, we asked individuals to indicate what ecommerce platforms they use. We grouped the results into generic and digital farmgate categories.

Farmers' markets and hubs more commonly use 'tailored' farmgate platforms (e.g., Local Line, Local Food Marketplace, OFN). Farmers and vendors showed a slight preference for 'generic' ecommerce solutions (e.g., Shopify, Square).



Farmer and Farmers' Market Vendor Ecommerce Use



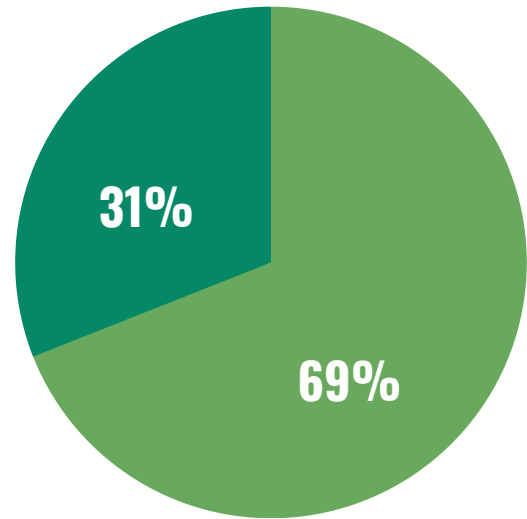
Farmers' Market and Food Hub Ecommerce Use



Participants prioritise interoperability between generic ecommerce and digital farmgate platforms.

Which of these two options would you find more useful?

- 1.If 'tailored' farmgate platforms (e.g., Local Food Marketplace, Local Line, OFN) could 'talk' to each other.
- 2.If 'generic' ecommerce platforms (e.g., Shopify, Square) could 'talk' to 'tailored' farmgate platforms (e.g. Local Food Marketplace, Local Line, OFN).



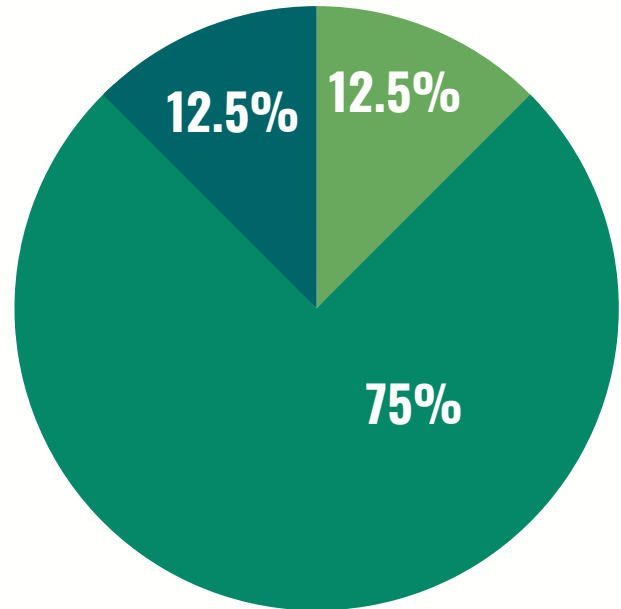


GAUGING INTEREST IN THE DFC OPEN STANDARD

Participants overwhelmingly preferred the DFC open standard as an interoperability solution.

Of the three interoperability solutions we presented, which would be of most interest to you?

-  Shopify & Open Food Network Integration
-  DFC Open Standard
-  Farm Management Software & Open Food Network Integration



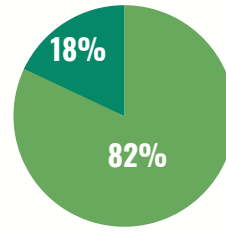
On the Shopify app—I think that this is an interesting, kind of quick solution. But the thing that comes to mind is that for us as a non-profit, price point is important. So, for instance we don't find it affordable to have a Shopify store. I could see it very beneficial for those who do have Shopify, but I'm personally more interested in that 'big picture' open standard approach.

-Farmers' Market Manager

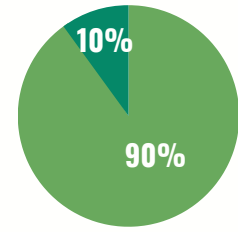


Participants overwhelmingly support bringing DFC open standard interoperability solutions to Ontario.

90% of respondents would be willing to endorse the DFC open standard.



Would you be willing to support us moving forward with this initiative?



Would you be willing to sign a letter of support for the DFC open standard?



For me, as a market organizer, I think [the DFC open standard] would be absolutely essential. This would be the key thing that would bring us back onto an online platform.

-Farmers' Market Manager

WHY THE DFC OPEN STANDARD VS OTHER SOLUTIONS?

According to focus group participants, the DFC open standard would make their lives easier, by addressing their core ecommerce business needs. The DFC open standard was the approach that they found to be best aligned with their values, as compared to other showcased approaches. The DFC open standard's focus on enhancing interoperability across all of the local food sector's key tech providers appealed to stakeholders who wanted complete solutions. In other words, the DFC open standard was seen as the best suited to address all challenges facing the sector at once, in contrast to one-to-one interoperability approaches that are more piecemeal.



An [open standard] would make my life easier. It would remove some of my work load and likely reduce data entry errors.

-Farmers' Market Manager



This [DFC open standard] initiative shifts the food tech landscape from one of competition to cooperation, so farmers and producers have more flexibility in direct sales. We need this kind of positive direction in our food system.

-Farmer



I feel like our needs do align with these [DFC open standard] pieces. I think the important part for us would be having sort of a seamless inventory management system—one that was, you know, compatible across multiple platforms. That would definitely be a benefit.

-Community Food Organization Manager



I think [the DFC open standard] would be the absolutely essential key thing that would bring us back onto an online platform. The ability to do cross-platform sales would be essential...and then, definitely, if there was logistics and delivery platforms that were incorporated as well, that would be the icing on the cake. That would be perfect. All of our needs would be met, I think.

-Farmers' Market Manager



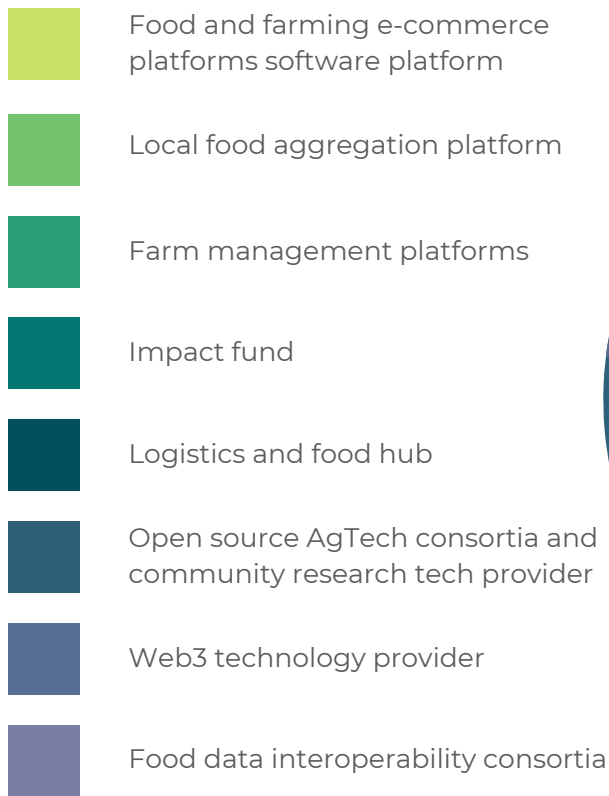
INDUSTRY ENGAGEMENT OUTREACH & RESEARCH PROCESS

From June 2022 - January 2023, we engaged a total of 13 ecommerce, AgTech, farm management, and social impact organisations, using outreach mechanisms such as one-to-one discovery calls, fact finding roundtables, product demos, and technical 'deep dives' on the DFC open standard schema and ontology.

This group of 13 organisations included 3 food and farming ecommerce platforms (Local Food Marketplace, Local Line, OFN); 1 local food aggregation platform (Permanent); 2 farm management platforms (LiteFarm, FarmOS); 1 impact fund (Collega); 1 logistics and food hub software platform (Farm Fare), 1 open source AgTech consortium (OpenTEAM, OurSci), 1 web3 technology provider (Startin' Blox), 2 food data interoperability consortia (Food Data Collaboration, Data Food Consortium).

We note that these organisations represent a strong cross-section of players at the more upstream end of the local food sector value chain, focused a little more on ecommerce and farm management integration use cases rather than sales and logistics/distribution. This is in contrast to use cases in the European consortia, which have focused more on downstream inventory, sales, and distribution/logistics management use cases.

Discussion with the European consortia and industry players in this region indicate, however, that the differing focal points of these jurisdictional cohorts represent complementary rather than conflictual use cases. Further developing the DFC open standard for use in upstream contexts would add further value to the DFC open standard, increasing the scope of its potential applications to span use cases across the entire local food value chain.



DISCOVERY ROUNDTABLE

The Discovery Roundtable was the central event of our industry engagement process. The roundtable was hosted on 28 November 2022 and attended by 18 people, representing a total of 12 organisations.

Representatives from the [Data Food Consortium](#) and the UK-based [Food Data Collaboration](#) offered an introduction to the DFC open standard, providing an overview of key technical subjects such as schemas and W3C semantic standards ([W3C Web Ontology Language \(OWL\)](#) and [RDF](#)); authentication protocols ([OpenID Connect \(OIDC\)](#)); and interoperability and API approaches ([REST API](#)).

Representatives from the Data Food Consortium and the UK-based Food Data Collaboration also provided an overview of how their consortia are collaborating around the shared stewardship of user data, and the collaborative development of the DFC open standard itself.

Following the delivery of the Discover Roundtable, participants were sent a follow-up survey, the results of which are compiled below, in the 'Results of DFC Roundtable.' section. This section offers a thematic analysis of the industry feedback that we received, grouping participant responses around key issues, uses cases, and challenges.



DFC ONTOLOGY DEEP DIVES

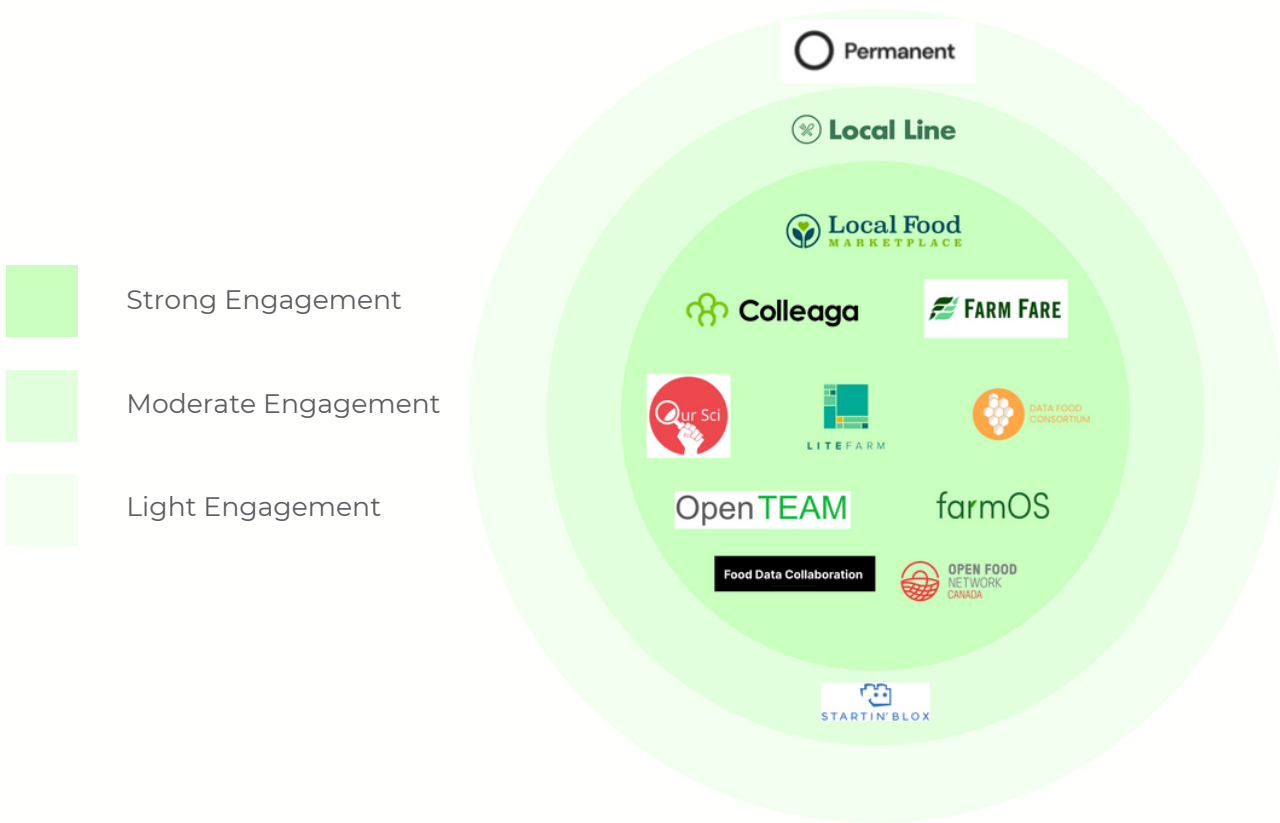
In response to direct requests from participating platforms, we also delivered two follow-up sessions that focused on providing a 'deep dive' on the DFC open standard's semantic ontology. The semantic ontology is a key component of the DFC open standard as it provides a machine- and human- readable 'vocabulary' for describing agrifood short supply chain products. This vocabulary acts as a 'digital language' that platform APIs use to communicate with each other, "provid[ing] a common framework that allows data to be shared and reused across application, enterprise, and community boundaries" ([W3C](#)). By necessity, these ontology deep dive sessions were more technical in nature, and were attended primarily by CTOs and engineers from the organisations that took part in the Discovery Roundtable. Discussion during these sessions focused on the following key issues:

- The DFC [product](#), [business](#), and [technical](#) ontologies
- [W3C Web Ontology Language \(OWL\)](#).
- [RDF](#) and [Solid](#)
- Tricky use cases such as product variants, flexible units, value chain transformations
- Cross platform product listing and traceability
- Interoperability between ecommerce and farm management platforms



INDUSTRY ENGAGEMENT RESULTS

MAPPING INDUSTRY ENGAGEMENT



Strong Engagement: Participated in one-to-one touch base call, attended the Discovery Roundtable and Ontology Deep Dive; completed the follow-up survey, and expressed interest in continuing discussion around the DFC open standard.

Moderate Engagement: Participated in one-to-one touch base call, and the Discovery Roundtable or the Ontology Deep Dive. Expressed interest in receiving briefing materials and/or recordings of the Discovery Roundtable and/or Ontology Deep Dive.

Light Engagement: Participated in one-to-one touch base call. Expressed interest in receiving briefing materials and/or recordings of the Discovery Roundtable and/or Ontology Deep Dive.



RESULTS FROM DFC ROUNDTABLE AND FOLLOW-UP SURVEY

THERE IS UNIVERSAL ACKNOWLEDGMENT OF THE NEED FOR COMMON STANDARDS

Industry stakeholders universally agreed that there is a need for a common standard in the local food and farming sector. We asked participants who attended our Discovery Roundtable the following question: 'Do you think the local food sector in North America stands to benefit from the use of a common data standard?' All respondents indicated that they strongly believed that this would be the case. These sentiments were also echoed during one-to-one discussions with industry players:



Having integrated multiple applications in this [local food sector] space, I can say it would drastically benefit from a standard. Those integrations showed us that even when trying to represent the same things, those data typologies can be wildly different, with no consistent mapping between the two.

-Co-Founder, AgTech Platform



At [our organisation] we grapple with the challenges of helping food hubs collaborate every day. Anything that lowers the barriers to communication is a gain in our opinion and the proposed APIs are a move in the right direction.

-Co-Founder, AgTech Platform



[A standard] would allow different stakeholders to streamline data input while still gaining access and benefits to multiple markets / revenue streams. This could also go beyond just sales channels, allowing stakeholders to realise other types of benefits (depending on position or stage in the food and agriculture system).

-Facilitator, AgTech Community Group



{We are} very interested in data standards in service of interoperability.

-Founder, AgTech Platform



[Our organisation's] tech community is interested in data interoperability for farm / agricultural tech tools, and actively working towards more standardised data formats across tools. We were excited by the overlapping but slightly different use case of the DFC standard.

-Facilitator, AgTech Community Group



We have a longstanding interest in interoperability in general. As we formalise [our] data model toward becoming something like a standard itself, DFC is certainly a model we can learn a lot from. Of particular interest are DFC's implementations using RDF and Solid, as it becomes increasingly clear that [we] could benefit from those tools as well.

-Software Engineer, AgTech Platform



A standard would benefit the local food system, by facilitating interoperability between tools and ecosystems.

-CTO, AgTech Platform

MAJOR PAIN POINTS FOR INDUSTRY STAKEHOLDERS

We asked industry stakeholders to describe the pain points and challenges that result from a lack of a common data standard in the local food and farming sector. All respondents agreed that the lack of a common standard between local food technology providers was a major challenge for their organisation, and for the sector as a whole. For tech providers, lack of a common standard results in wasted developer time, replication of work, and data siloing. Industry players also reported the same end-user interoperability-related pain points that were identified by market managers and farmers in our focus groups (i.e. lack of cross platform sales functionality, increased data management workloads, and inefficient inventory management). Industry players understand that it will take considerable time, resources, and relationship building to address the technical dilemmas faced by farmers, food hubs, and farmers' markets. There was also widespread acknowledgement that many of the key technology challenges that stakeholders face could be resolved through implementation of a common standard.



Every farmer is talking about the same product, but in different terms. This leaves hubs unable to identify swap opportunities, or tell large institutions how much of a product they have available. It also creates tons of confusion with customers. For example, a customer that normally buys a 20lb box of tomatoes doesn't know how to translate that to bushels when there are no more 20lb boxes. And all this diversity leaves software unable to interpret the situation.

-Co-Founder, AgTech Platform



We see that farmers and technical service providers who assist farmers are burdened by the amount of data entry required for each tool they want to utilise. There is a huge time input required of these processes, and a lot of the data collected is redundant across tools. If there was a common data standard in our space, it would allow data owners to submit data once, and then route that data to tools of interest, as long as those tools all share a data standard.

-Facilitator, AgTech Community Group



There is so much wasted developer time ... no one can hope to solve meaningful problems, and because all those efforts are siloed, it leaves a difficult decision to [farmers and farmers' markets] to choose between one incomplete solution or another, or give themselves double-entry work if they try to use both.

-Software Engineer, AgTech Platform



Without a standard, we have to do our own original research that surely has happened many times before; and we experience difficulty in integrating with other systems based on lack of common definitions of ideas.

-CTO, AgTech Platform

POTENTIAL USE CASES FOR A COMMON STANDARD

Industry stakeholders believe that a common standard would make the day-to-day operations of platform developers and technology users easier. Industry stakeholders understand that a common standard would support actors across the entire local food sector, enabling sector-wide efficiencies.



A common standard is especially important in the context of a local food sector that trades in non-shelf-stable commodities with complex storage and distribution needs. Industry stakeholders described a variety of use cases that would result from the adoption of a common standard in the local food and farming sector. Enhanced inventory management for farms and hubs, opportunities for advanced analytics and high-quality reporting, and integrations between farm management and ecommerce platforms were all highlighted as high-value use cases.

ENHANCED INVENTORY MANAGEMENT AND CROSS PLATFORM SALES

Industry stakeholders understand that inventory management is one of the most time-consuming and essential administrative tasks that producers, retailers, and supply chain coordinators face. During the roundtable, and in subsequent survey feedback, industry stakeholders highlighted some of the advantages that a common standard would offer end users from this standpoint. In line with the findings of stakeholder focus groups, industry players highlighted cross-platform sales functionality, enhanced inventory management, and improved supply chain coordination as desirable outcomes that would be facilitated by a common standard. Industry players also identified some of the unique challenges that attend inventory management in the context of short supply chains and local food systems (e.g. the need for flexible units, the complexity of diversified farms' inventory, and a general lack of standardisation in terms of product names and properties):



[A common standard] will allow different stakeholders to streamline data input while still gaining access and benefits to multiple markets/revenue streams. This could also go beyond just sales channels, allowing stakeholders to realise other types of benefits (depending on position or stage in the food and agriculture system).

-Facilitator, Community Research Tech Provider



A common standard would benefit our users, particularly as the kind of top-down, globally centralised information systems that dominate commodity crop agriculture and distribution do not seem well disposed to handling the complexity of growing, trucking and selling anything other than corn, wheat and soy.

-Software Engineer, AgTech Platform



Flexible units are something we consistently hear about from farmers. Rather than 5 kg of potatoes, a bag of potatoes. Rather than 5 g of basil, a satchel of basil. A way to include this would be exceptionally useful in our use cases.

-CTO, AgTech Platform



A common standard would facilitate:

1. Selling between hubs/aggregators.
2. Common language when speaking to institutional markets.
3. Lack of industry wide data to create compelling 'stories' with/make a case to funders and policy advocates
4. Inability to provide accurate information to crop insurance brokers/underwriters
5. Software interoperability

-Co-Founder, AgTech Platform

OPPORTUNITIES FOR ADVANCED ANALYTICS, REPORTING, AND AGRIFOOD DATA RESEARCH

Roundtable participants suggested that a common standard would facilitate enhanced predictive analytics for farms and simplify reporting processes for agrifood nonprofits and other grant recipients. There was some discussion of the role that [Solid Pod](#) architecture could play in facilitating the development of [Data Trusts and Data Coops](#) in partnership with members' associations and trusted third parties. The creation of a new generation of agrifood data markets promises to provide farms and local food system players with new revenue streams via the sale of anonymised data to academic and government research centres.



We know that data standards are central to interoperability and better data reporting. Better reporting is central to [government] support and decision making within regional food systems.

-Co-Founder, AgTech Platform



Long term I think we will need to make data more available to players around the food system (for example policy makers, or insurance providers). However, on a shorter timeline implementing this [DFC] standard/API would get us many benefits with less work.

-Co-Founder, AgTech Platform



FARM MANAGEMENT AND ECOMMERCE INTEGRATIONS

Industry players reported that a common standard would facilitate interoperability between multiple types of tools, across every segment of the agrifood supply chain, from production (farm management and soil science platforms), to inventory and sales (ecommerce and dynamic procurement platforms), to distribution and logistics (logistics platforms). The cohort of players that we assembled show particularly strong interest in the essential role that a standard would play in facilitating interoperability between ecommerce and farm management platforms. We asked roundtable participants if increasing interoperability between ecommerce and farm management platforms was something that interests your organisation, at this point in time". The vast majority who answered the question (86%) agreed that it was a priority, and expressed strong enthusiasm in subsequent open-ended text responses.



YES! YES! YES!

-Co-Founder, AgTech Platform



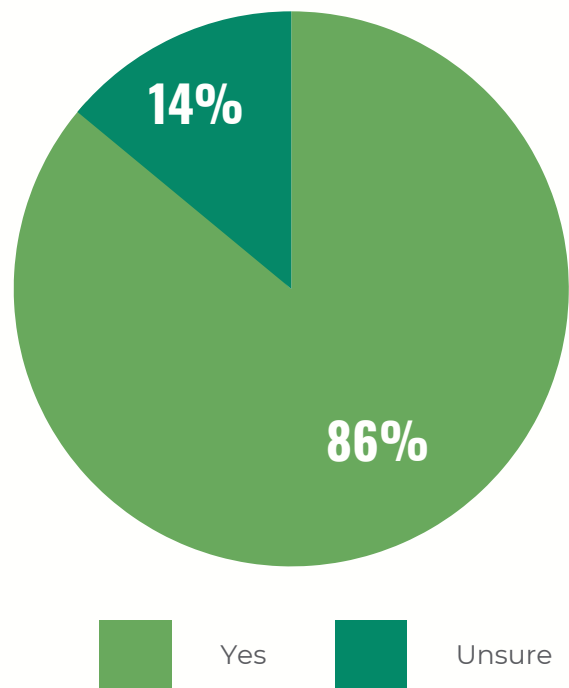
Yes, absolutely!

-Facilitator, Community
Research Tech Provider



Absolutely!

-Software Engineer, AgTech
Platform



STAKEHOLDER CONSIDERATIONS AND NEXT STEPS

The suite of interoperability services that the DFC open standard provides dovetails well with the interoperability goals of the majority of the partners we engaged. However, more discussion and scoping is required to determine if the DFC open standard is the right solution for this region at time. In particular, future work is required to determine how the DFC open standard would be implemented in practice by industry stakeholders. Respondents underscored that before a regional implementation of the DFC open standard was possible, there would need to agree on robust and transparent



protocols concerning the ethical and transparent stewardship of user data and the ongoing collaborative development of the standard.

DATA STEWARDSHIP AND THE GOVERNANCE OF STANDARD DEVELOPMENT

A key consideration highlighted by roundtable participants concerned how user data would be governed and stewarded by participating in a North American data consortium. Participants stressed that further discussion and scoping would be needed in order to develop transparent data sharing protocols that were acceptable to both industry players and end-users. Similar questions apply to issues such as the development of the standard itself, especially with regard to how a consortium of North American players would further develop the standard to ensure a fit with North American jurisdictional regulations.



How is DFC considering data sharing, access, deletion, etc. within this interoperable space?

-Facilitator, AgTech Community Group



Governance is a critical topic.

-Co-Founder, AgTech Platform



[I am] particularly interested in how obligations for partnering platforms are established in the first place, then how compliance is judged and audited as partners join and maintain good standing.

-Software Engineer, AgTech Platform



Responsiveness and governance around proposed changes to ontology are a critical area.

-CTO, AgTech Platform



Data is perhaps the most valuable thing the local food ecosystem offers. We are at a very critical/fragile point in the market development. We are really concerned about where that data lives/who has access to it/how accessible it is etc.

-Founder, AgTech Platform



DRIVING BUY-IN

It is in the very definition of a 'standard' that it becomes established as a common norm for a majority of players in a sector. One of the obstacles that a new standard has to negotiate is driving 'buy-in' from a critical mass of players, as without significant uptake a standard cannot fulfil its function. Participants indicated that further relationship-building and discussion would be needed in order to reach a decision on the cohort's adoption of the DFC open standard:



As a North American cohort, we need to decide this is something we aim to work towards.

-Co-Founder, AgTech Platform



My chief concern is that no one else [in North America currently] implements it, so there is no benefit to implementing it ourselves.

-Co-Founder, AgTech Platform



We need to establish a business case across multiple organizations to support this type of initiative. Where are the points of leverage in the food ecosystem? Who's got the money, business case for this, etc?

-Board Chair, Impact Fund



CONCLUSION

Our focus group research with local food systems stakeholders confirmed that lack of ecommerce platform interoperability is a key challenge facing local food system stakeholders in Ontario, with lack of interoperability and cross-platform sales functionality frequently resulting in lost sales for farms and the failure of online markets. These challenges are experienced despite the fact that most local food system stakeholders and short supply chain players continue to use digital tools, reporting significant business-related benefits since adopting them.

Meanwhile, industry players such as ecommerce platforms, food hub platforms, and farm management platforms universally acknowledged that lack of a common standard negatively impacts their end-users in local food systems. Industry players also identified some of the specific challenges and inefficiencies that lack of a common standard creates for developers and engineers. Notable challenges and pain points include: wasted developer time, data siloing, and the replication of work that has already been usefully completed elsewhere (i.e. 'reinventing the wheel').

Our market validation research thus demonstrates that there is substantial end-user and industry demand for the interoperability solutions and enhanced digital services that the DFC open standard is designed to provide. In summarising how end-user needs and priorities compare to those of industry players, the following Research Summary Table details what we learned from the two phases of our DFC open standard market validation research:



END-USERS	INDUSTRY PLAYERS
SUCSESSES, USE CASES, AND PAIN POINTS	
<ul style="list-style-type: none">• Participants had an overwhelmingly favourable view of digital platforms in general, with the majority (>70%) reporting that digital tools increase their sales and make farm and market management easier.• Markets tend more often to use dedicated digital farmgate platforms while farmers instead use a combination of generic and farmgate digital tools.• A majority of stakeholders (>60%) reported that lack of interoperability between ecommerce platforms made data management time consuming and challenging• Lack of interoperability frequently resulted in lost sales for farms and the failure of online markets.• The vast majority of stakeholders (>80%) report that the ability to conduct 'cross-platform' sales and transactions would help local food businesses scale and succeed	<ul style="list-style-type: none">• Industry stakeholders universally agree that there is a need for a common standard to address lack of interoperability in the local food and farming sector• Industry stakeholders reported that their technology users frequently face frustrations related to lack of interoperability, resulting in increased developer time• Industry stakeholders strongly believed that a common standard would enable sector-wide efficiencies and the development of more advanced technologies• The vast majority of industry stakeholders were interested in enhancing interoperability between ecommerce, farm management, and soil science apps – for the purpose of enhancing predictive analytics and supply chain transparency and traceability



END-USERS	INDUSTRY PLAYERS
SOLUTIONS, NEXT STEPS	
<ul style="list-style-type: none">• Stakeholders prioritised ecommerce platform interoperability before other interoperability solutions (i.e. their most immediate needs are for ecommerce tools that ‘work together’).• The most urgent interoperability need of local food systems stakeholders at this time is the ability to conduct secure cross-platform sales and transactions.• The vast majority of stakeholders (>80%) want more interoperable and modular ecommerce systems.• Participants overwhelmingly preferred the DFC open standard when presented with other interoperability solutions and projects.	<ul style="list-style-type: none">• Industry stakeholders prioritised ecommerce and farm management platform interoperability before other interoperability solutions• The key concerns industry stakeholders had with respect to the implementation of the DFC standard were related to its governance (how data is managed and decision-making is undertaken), and assuring its widespread implementation among technology providers• Ongoing discussion, scoping, and negotiation will be required to determine if the DFC open standard is the right solution for AgriTech providers in this region

The findings detailed in this summary table clearly demonstrate that end-users want a more modular and interoperable AgTech ecosystem. The interoperability requirements of end-users are driven by their need to effectively scale and optimise agrifood short supply chains and local food marketplaces.

These findings also confirm that industry players recognise that the adoption of a common standard would provide their users with substantial benefits, and enhanced digital services. In addition to supporting the cross platform sales functionality that end-users want, industry players also report that the adoption of a common standard could unlock innovation in a host of other areas. There is thus substantial alignment between stakeholder needs and industry objectives, and significant early-stage interest in the DFC open standard itself as a solution of interest to both stakeholder groups.,

However, industry players also highlighted that the adoption, implementation, maintenance, and ongoing co-development of a standard is a challenging task, requiring robust data stewardship, and standard development, governance protocols.



A related challenge is a common standard must secure widespread buy-in and adoption from a substantial cohort of industry players, that to function as it is designed to, Without sector-wide buy-in the benefits of a standard cannot be realised. Establishing a new standard in a region is therefore a ‘heavy lift,’ requiring the development of trust and cooperation between tech providers that may have good reason to view each other as direct competitors. Nonetheless, the success of global health data projects such as [CDISC](#) demonstrates that complex cross-sectoral interoperability and data stewardship initiatives can succeed at scale.

In addition to the mature precedents provided by health data standards and consortia, short supply chain players in this region can also draw on the experience of innovative European AgTech interoperability consortia such as the Data Food Consortium and the Food Data Collaboration, who are already successfully piloting the implementation and adoption of the DFC open standard in their own jurisdictions.

To replicate these successes in the context of this region’s agrifood short supply chains and local food systems it will be necessary to implement a new phase of networking and stakeholder engagement, to support ongoing discussion, trust building, and collaboration between industry players.

The work that we have completed in the course of this research lays a foundation for such a process. The industry outreach that we conducted in the course of this market research was the first occasion that all of these regional players were brought to the table to discuss a common standard as a cohort. A key next step for this cohort will be to determine whether the DFC open standard is the most expedient solution for players in this region at this point in time. Further discovery and scoping sessions will need to occur before players can arrive at a decision on this matter.

By continuing to support scoping and discovery sessions around the DFC open standard and sector-wide interoperability initiatives in general the province of Ontario can help to ensure that its local food short supply chain stakeholders gain access to essential technology services that can do much to enhance the efficiency, performance, and profitability of agrifood short supply chains. Whether or not the DFC open standard is ultimately selected by players in this region as their standard of choice, supporting this cohort’s ongoing discovery and scoping of the DFC open standard would do much to help the sector define its overarching interoperability strategy going forward.

In addition to resulting in more efficient agrifood short supply chains and increased market access for direct-to-consumer farms, the adoption of a common standard in this sector also promises to provide secondary benefits such as increased consumer access to local food products and new opportunities for the institutional procurement of local food and farming products.



At the same time, a common standard also promises to open up new market opportunities and revenue streams for farms, aggregators, and members' associations by laying the technical foundations for the development of equitable and secure markets for agrifood data through the development of data coops and data trusts.

Agrifood data co-ops and data trusts have the potential to provide industry, government, and academic research centres with powerful insights into agrifood short supply chains and local food systems. Such insights can assist researchers, policymakers, and decision-makers in the crucial task of accurately measuring progress toward Sustainable Development Goals as well as [Canada's net-zero emissions](#) targets for 2030 and 2050.